

What is claimed is:

1. A communication system comprising:

a higher layer;

a first layer as a physical layer; and

5 a second layer as an intermediate layer for processing data from the higher layer to generate multicast data and multicast control data, the second layer including at least one logical channel for transmitting the multicast data from the higher layer, at least first transmission channel for transmitting the processed multicast data to the physical layer, and at least one second transmission channel for transmitting the multicast control data to the physical layer.

2. The communication system as claimed in claim 1, wherein the logical channel is a multicast traffic channel, and the transmission channel is a multicast channel and multicast control channel.

3. The communication system as claimed in claim 2, wherein the multicast control channel has a plurality of international motion groups, each of the groups is contained in each multicast paging cycle, and each of the groups includes international motion group identification factors $G_1, G_2, G_3, \dots, G_{n-1}, G_n$ by the number of

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n (where, n is a positive integer),.

4. The communication system as claimed in claim 2, wherein the multicast control channel is periodic while the multicast channel is non-periodic.

5 5. The communication system as claimed in claim 1, wherein the second layer is for a down link.

6. The communication system as claimed in claim 1, wherein the second layer is a medium access control-multicast layer.

7. The communication system as claimed in claim 1, wherein the step of processing the multicast data includes scheduling for generating the multicast control data, selecting an appropriate coding mode, and multiplexing for mapping with the physical layer.

8. The communication system as claimed in claim 1, wherein the logical channel transmits the mulitcast data based on a point-to-multi-point service, a unidirectional service, multicast data transmission, and a prior subscription.

9. The communication system as claimed in claim 1, wherein the physical layer uses a common radio link which does not require

power control.

10. The communication system as claimed in claim 1, wherein the first transmission channel are two or more different channels when the multicast data has different characteristics.

5 11. The communication system as claimed in claim 10, wherein the different characteristics are different service qualities such as different coding modes, different repeated number of times, and different interleavings.

12. The communication system as claimed in claim 1, wherein the multicast control data includes transmission rate change of the multicast data, scheduling of channels, code usage of the multicast data, decoding time period of the multicast data, a transmission section of the multicast data, a sleep mode of a user, code assignment information of the multicast channels, and frame assignment information of the multicast channels.

13. The communication system as claimed in claim 1, wherein the second layer further includes a broadcasting channel(BCH) to partially transmit the multicast control data.

14. The communication system as claimed in claim 13, wherein

the broadcasting channel includes information indicative of availability of multicast service, information indicative of subscriber groups available for the multicast service, and information on configuration of the multicast control channel.

5 15. The communication system as claimed in claim 14, wherein the information on the configuration of the multicast control channel includes information as to which code has been used for the multicast control channel, and information on cycle of the multicast control channel.

16. The communication system as claimed in claim 15, wherein the broadcasting channel includes information on the multicast channel.

17. The communication system as claimed in claim 16, wherein the information is required when the multicast service uses multi-code, and includes information on high transmission rate of the multicast data and information on a variable transmission rate of the multicast data.

18. The communication system as claimed in claim 1, wherein the physical layer is mapped with the first transmission channel of the second layer, and includes a physical multicast channel having

a pilot bit for channel estimation and a physical multicast control channel mapped with the second transmission channel.

19. The communication system as claimed in claim 18, wherein either the physical multicast channel or the physical multicast control channel includes a TFCI field in accordance with the variable transmission rate of the multicast data.

20. The communication system as claimed in claim 19, wherein the TFCI field is contained in the physical multicast channel having continuity if the transmission rate of the multicast data is varied per frame, while the TFCI field is contained in the physical multicast control channel if the transmission rate of the multicast data is not varied during the multicast paging cycle.

21. The communication system as claimed in claim 20, wherein the physical multicast channel is non-periodic while the physical multicast control channel is periodic.

22. The communication system as claimed in claim 20, wherein the physical multicast control channel is either a secondary control channel or SCH.

~~23.~~ A communication system comprising:

a higher layer for performing authentication and ciphering and for supporting signalling for subscriber identification;

a third layer for flexibly varying a transmission rate of multicast data under the control of the higher layer, having a radio resource control layer for supporting scheduling on channels and code usage;

a second layer having a multicast traffic channel as a logical channel for transmitting the multicast data, a multicast channel as a first transmission channel, and a multicast control channel as a second transmission channel for transmitting multicast control data, the second layer consisting of a medium access control layer for performing scheduling for the logical channel and multiplexing and demultiplexing between the logical channel and the transmission channels and for dynamically supporting transmission rate of the multicast data; and

a first layer as a physical layer for supporting the multicast data and a used multi-code to be downwardly transmitted to a user.

24. The communication system as claimed in claim 23, wherein the first layer uses PMCH as a physical channel if the multicast channel is used as the first transmission channel and uses either a secondary common control physical channel or SCH as a physical channel if the multicast control channel is used as the second transmission channel.

25. The communication system as claimed in claim 24, wherein the secondary common control physical channel includes a TFCI field, a data field and a pilot field, sequentially.

~~26.~~ A communication system comprising:

a higher layer;

an intermediate layer having at least one logical channel for processing data from the higher layer to generate multicast data and multicast control data and at least one transmission channel for transmitting the multicast data and the multicast control data to a lower layer; and

a physical layer having a single physical channel of a predetermined band, for processing the multicast data and the multicast control data in a data field type on the physical channel.

27. The communication system as claimed in claim 26, wherein the physical channel includes a TFCI field, a data field having the multicast data and the multicast control data, and a pilot field, sequentially.

~~28.~~ A method for managing multicast services comprising the steps of:

(a) requesting a network of multicast services through AS at

a UE-NAS in an idle state without performing the multicast services;

(b) transmitting corresponding data to the UE on a multicast channel and a multicast traffic channel for data transmission of the network and a multicast control channel for control data transmission when the multicast service request is successfully achieved;

(c) switching the idle state of the UE to a sleep release state for decoding the data transmitted from the network; and

(d) switching the idle state of the UE to a sleep state for waiting for the data if there is no data transmitted from the network.

29. The method as claimed in claim 28, wherein the multicast channel and the multicast control channel are used as transmission channels and the multicast traffic channel is used as a logical channel.

30. The method as claimed in claim 28, further comprising the step of informing the network of multicast service release if the UE receives all data.

31. The method as claimed in claim 28, wherein the step (a) includes the steps of:

(e) requesting the UE-AS of the multicast services by the UE-NAS;

(f) requesting the network of the multicast services on a dedicated transmission control channel by the UE-AS;

(g) requesting the UE of authentication of members of subscriber groups by the network; and

(h) acknowledging the multicast services by the network when the UE-AS responds to the request for authentication of the network.

32. The method as claimed in claim 31, wherein the UE informs the network of its own international motion group identifier in the step (f).

33. The method as claimed in claim 31, wherein the network requests the UE of authentication of members of subscriber groups with random numbers in the step (g).

34. The method as claimed in claim 31, wherein the UE receives a secure ciphering key for decoding the multicast data from the network in the step (h).

35. The method as claimed in claim 31, wherein the dedicated control channel is used through the overall steps to proceed the

request procedures for the multicast services.

36. The method as claimed in claim 31, wherein the step (e) includes the steps of:

receiving the request for the multicast services from the UE-NAS at the UE-AS;

informing the US-AS of an international motion group identifier of the UE-NAS; and

calculating multicast paging block by the UE-AS and completing a service request arrangement to the network.

37. The method as claimed in claim 31, wherein the overall steps are performed in a radio resource control layer of the UE-AS and the UE-NAS.

38. The method as claimed in claim 28, wherein the step (b) includes the steps of: (i) receiving the network-NAS of the service request by the network-AS; (j) transmitting requested multicast data, a corresponding international motion group identifier, location information of a corresponding user, coding, repeated number of times and information of interleaving degree to the network-AS; and (k) transmitting all information transmitted from the step (i) to the UE-AS.

